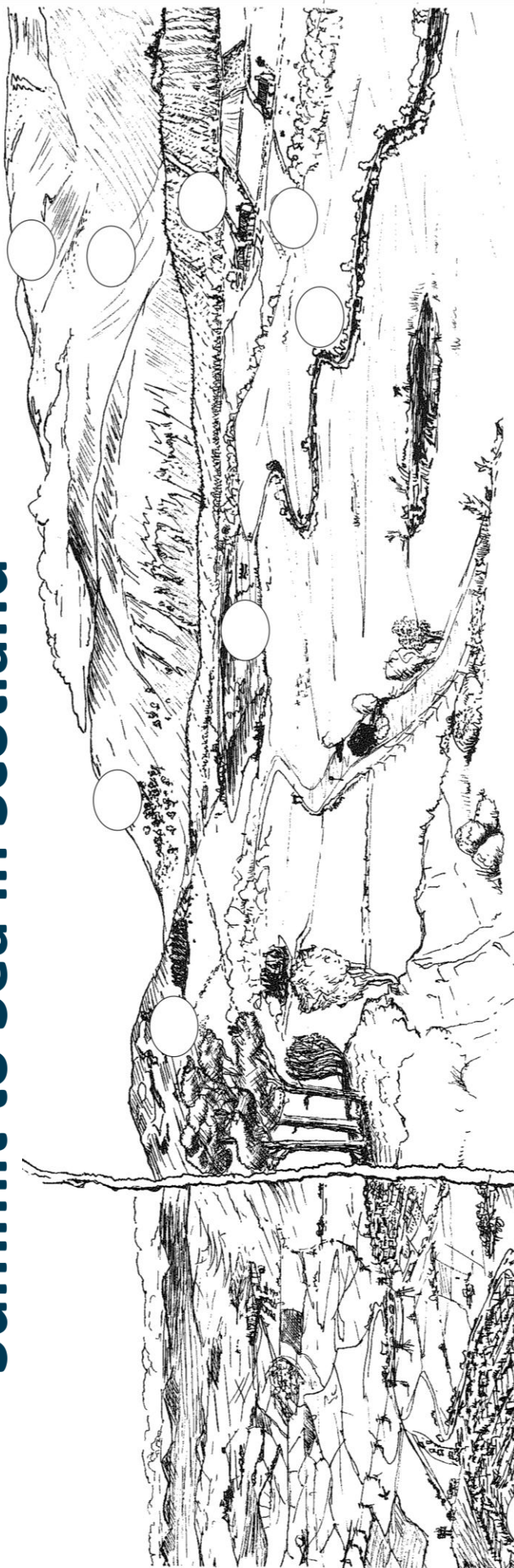


Summit to Sea in Scotland



These two pictures show a variety of habitats, from rural mountains to an urban coast.

This view is similar to what can be seen from our Discovery and Learning Hub at Highland Wildlife Park.

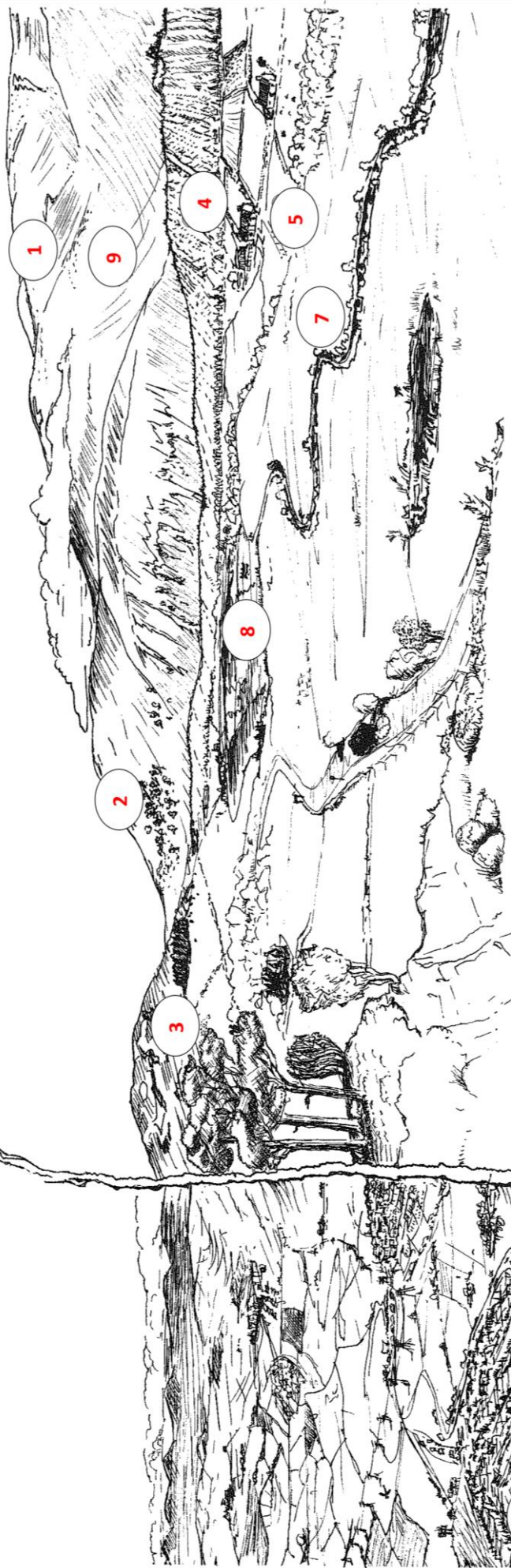
Habitats

- | | |
|--------------------------------|-----------------------|
| 1. Mountains and Alpine Tundra | 7. River |
| 2. Moorland | 8. Loch |
| 3. Caledonian Pine Forest | 9. Peat bog |
| 4. Plantation Woodland | 10. Urban |
| 5. Farm and Scrub Woodland | 11. Estuaries |
| 6. Open Sea | 12. Coasts and Shores |

Please mark in the correct habitats (number in the circles) 1-12 and fill in the accompanying worksheet.

Answers

Summit to Sea in Scotland



These two pictures show a variety of habitats, from rural mountains to an urban coast.

This view is similar to what can be seen from our Discovery and Learning Hub at Highland Wildlife Park.

Habitats

- | | |
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Please mark in the correct habitats (number in the circles) 1-12 and fill in the accompanying worksheet.

Scotland's Habitats

Complete the table below as part of *Summit to Sea in Scotland*.

Give as many example as you can.

| Type of habitat | Give named examples of this habitat | Examples of bird species found in this habitat | Examples of other animals found in this habitat |
|--|-------------------------------------|--|---|
| Mountains / Alpine tundra | | <i>Ring ouzel</i> | |
| Moorland | | | |
| Peat bog | | | |
| Caledonian Pine Forest and Plantation Woodland | <i>Glen Affric</i> | | |
| Farmland and Scrub woodland | | <i>Pheasant</i> | |
| Urban | | | <i>Fox</i> |
| Fresh water: Loch and Rivers | | | |
| Coast and Shore | | | |
| Estuaries | <i>Beaully Firth</i> | | |
| Open sea | | | <i>Basking shark</i> |



For further activities
rzss.org.uk/education

<https://cairngorms.co.uk/discover-explore/landscapes-scenery/> - Landscapes in the CNP

<https://maps.the-hug.net/> - Ordnance survey maps of Britain.

Answers: Summit to Sea in Scotland (The habitats of Scotland and additional info).

| Type of habitat | Give named examples of this habitat | Examples of bird species found in this habitat | Examples of other animals found in this habitat |
|---|--------------------------------------|--|---|
| Mountains / Alpine tundra | Cairngorms | <i>Ring ouzel</i> / <i>Snow bunting</i> / <i>Golden eagles</i> | Ptarmigan / Mountain hare / Reindeer |
| Moorland | Rannoch Moor | Red grouse / Hen Harrier | Highland cattle / Common lizard |
| Peat bog | Flow Country, in Sutherland | Curlew / Hen Harrier / Merlin | Red deer / Frog / Otter |
| Caledonian Pine Forest and Plantation Woodland | <i>Glen Affric</i> Moor of Feshie | Crested tit / Capercaillie Buzzard | Red deer / Wildcat / Red Squirrel Roe deer / Rabbit |
| Farmland and Scrub woodland | Dunachtonmore Farm | <i>Pheasant</i> / Barn owls, Tawny owls | Badger / Bats / Brown hare |
| Urban | Inverness | Pigeon / Sparrow | <i>Fox</i> / <i>Peregrine falcons</i> / <i>grey squirrel</i> (introduced) |
| Fresh water: Loch and Rivers | Loch Morlich River Spey | Osprey / Whooper Swan Merganser / Dipper | Pike / Newts / Frog Salmon / Trout / Otter |
| Coast and Shore | Moray Coast | Grt Northern Diver / Puffin / Chough | Seal / Crab / Otter |
| Estuaries | <i>Beaully Firth</i> | Cormorant | Porpoise / Dolphin / Salmon |
| Open sea | North Sea | Gannet / Auk / Puffin | <i>Basking shark</i> / <i>Orcas</i> / <i>seals</i> / <i>whales</i> |

To learn more about the different habitats in the Cairngorms go to <https://cairngorms.co.uk/caring-future/cairngorms-landscapes/landscape-areas/>

Mountains / Alpine Tundra (Cairngorm Mountains).

The mountain areas of Scotland are generally regarded as ground beyond 700m above sea level. This is roughly the elevation of the former tree-line, where scrub and woodland remain scarce and where habitats are near-natural.

Mountain habitats consist mainly of moss and lichen heaths, snow beds, blanket bog and terraces of dwarf-shrub heath.

Approximately 12% of Scotland's land surface (3% of Great Britain) is mountain.

Birds: Ptarmigan / Dotterel / Golden Eagle / Snow Bunting.

Other animals: Arctic (Blue) Hare / Reindeer (introduced) / Stoat.





Moorland (*Monadliath Hills*)

The uplands of Scotland fall into two broad classes. Above the former tree-line lies high mountain habitat, below this, down to the upper reaches of enclosed farmland, sub-mountain land consists of moorland, rough grassland and bog. Moorland is dominated by dwarf shrubs, principally Heather (*Calluna vulgaris*).

Moorland is semi-natural, composed mainly of native plants which, though much changed in abundance, have been present since the early Holocene (post glacial period of the past 10,000 years). The distribution of moorland in Scotland has been defined by the census of the Land Cover of Scotland 1988. Recently published figures indicate that 8.7% of Scotland is covered by heather moorland; 8.4% by peatland; a further 15.7% by heather moorland and peatland mosaics; and 14.5% by rough grassland and moorland mosaics.

Birds: Peregrine Falcon / Red Grouse / Short-eared owl .

Other animals: Red Deer / Sika Deer (introduced) / Common Lizard / Wildcat / Feral Goat.

Peat bog (*Glenmore*)

Peat is an organic deposit formed when dead plant material fails to decay because it is constantly or intermittently waterlogged.

The living communities towards the surface become increasingly insulated from underlying mineral soils by the accumulating peat.

The resulting formation is known as peat bogs or 'mire', the general term for a peat-forming habitat.

A peat formation may extend for no more than a few metres around a spring outflow, or may drape across entire landscapes of hundreds of square kilometres. From the National Peatland Resource Inventory it has been estimated that blanket peat of greater than 1 metre depth covers 14% of Scotland.

Birds: Merlin / Raven / Curlew / Hen Harrier / Snipe

Other animals: Red deer / Otter

Caledonian Pine Forest (*Rothiemurchus*)

Plantation Woodland (*Moor of Feshie*)

The forest cover which developed in Scotland after de-glaciation was a western outlier of the European temperate/boreal (northern) forest transition zone. Prior to forest clearance in Scotland, the extent and composition of these forests changed in response to the prevailing climatic conditions. By 1919, when the Forestry Commission was established, Scotland's forests had declined to less than 5% of the land area, despite substantial tree planting by private landowners in the nineteenth century. The forest area then expanded steadily after 1919 and by 1992 it was estimated to cover approximately 14% of Scotland.

Birds: Capercaillie / Black Grouse / Crossbill / Buzzard / Long Eared Owl.

Other animals: Red Squirrel/ Pine Marten/ Red Deer/ Roe Deer.



Farmland and scrub woodland. (*Dunachtonmore Farm*)

Farmland is an important part of the natural heritage of Scotland and provides much of its wildlife habitat, landscape interest, recreational and sporting resource. About 80% of Scotland's land area (6.2 million hectares) is classed as agricultural land.

Of this, 9% is in arable production, 21% is grassland and 58% is rough grazing (11% is 'other') (ScotGov Agricultural Census, 2018). Over 90% of Scotland is classed as Less Favoured Area in the European Union, comprising land of low productivity where farming is necessary to prevent depopulation.

The farmland of Scotland can be divided into four broad types: hill livestock, lowland livestock and dairy, arable cropping, and crofting.

Birds: Lapwing / Pheasant / Corncrake / Barn Owl / Skylark / Tawny Owls.

Other animals: Rabbit / Brown Hare / Roe Deer / Hedgehog.

Urban Areas (*Inverness, Edinburgh, Glasgow*).

Scotland's population in the 1991 census was 5.1 million people, approximately 80% of whom live in towns and cities. Although urban areas cover only around 3% of Scotland's land area, it is the environment in which most people gain their everyday experience of the natural heritage.

The quality of Scotland's urban environment, founded mainly in the Central Belt on heavy industries and petrochemicals, has generally improved during the latter part of this century. The urban environment is important not only because it offers contact with the natural heritage for many people. It also provides a diverse range of habitats for plants and animals, such as semi-permanent public open space in towns and cities, consisting of public parks and gardens, rail and road corridors, canals, graveyards and recreational areas.

Birds: Peregrine Falcon / Kestrel / Tawny Owls.

Other animals: Red Fox / Badger / Grey Squirrel / Bats.

Fresh water: Lochs (*Loch Insh, Boat of Garten*).

Rivers (*River Spey, River Feshie*).

Scotland has an extensive array of fresh waters, with more than 90% of the volume and 70% of the total surface area of fresh water in the United Kingdom. There are more than 30,000 lochs and 6,600 river systems in Scotland.

The fresh waters of Scotland are a valuable economic, recreational and environmental resource for commercial and recreational fisheries. They are used for fish farming; for the supply of potable, agricultural and industrial water; as a source of energy for hydro-electric power; for the dilution of industrial and sewage effluent discharges; for recreational activities, both on and around the water and as a tourist attraction.

Birds: Dipper, Osprey, Merganser, Heron, Grebes, Grey wagtail, Swans

Other animals: Otter / Mink (non-native) / Beaver / Water vole / Great Crested Newt / Frog / Toad / Salmon



Coast and Shore (*Isles Skye, Hebrides*).

Measured along the mean high water mark, the coastline of Scotland is 11,803km in length. There are 800 islands with terrestrial vegetation, with about 600 of them lying off the west coast. There appears to be no estimate of the number of smaller islands, or skerries, which are at times wave-washed and carry no terrestrial vegetation. Scotland's diverse coastline is translated into an equally varied range of shoreline habitats. The character of a shore is dependent on a number of physical factors including wave exposure, salinity, geology, tidal range and strength of currents.

There have been numerous reviews and studies of specific elements of Scotland's shores but a comprehensive survey of the distribution of the habitats and species around the coast of Scotland is not yet complete.

Birds: Chough / Eider / Great Northern Diver.

Other animals: Rabbits / Toads / Crabs.

Estuaries (*Beaulf Firth, Forth, Clyde*).

An estuary is a partially enclosed area of water where sedimentation leads to the development of soft tidal shores open to the marine environment and to receiving fresh water from the land. Coastal indentation and connection of surrounding mountains make the landscapes of some estuaries particularly significant in Scotland.

Scottish estuaries range from small pristine sites with little human activity to highly industrialised areas such as the Clyde and the Forth, which have in recent centuries received very damaging discharges of industrial and domestic effluent. However, the rich, diverse wildlife and landscape interest of estuaries, often close to urban areas, offers special opportunities for environmental education and interpretation for all in the community.

Birds: Barnacle Goose / Avocet / Dunlin.

Other animals: Common and Grey Seal / Dolphin / Porpoise / Salmon.

Open Sea (*Irish, Atlantic, North Sea*).

The coastal waters around Scotland, which extend to depths of around 30 metres, give way to the open sea areas of the continental shelf, with waters of up to about 200 metres in depth, and beyond. The open sea to the east of Scotland is relatively shallow continental shelf water, in comparison to the deep sea of the Rockall Trough with depths in excess of 1,000 metres found relatively close to the coast off the west and north of mainland Scotland.

The water masses of the open sea are moved by winds and tides, and provide a natural habitat for a diverse range of species - from phytoplankton (microscopic aquatic plants) found in the upper layers of the sea, to fish and larger cetaceans (the whales) located in the deep sea.

Birds: Gannet / Skua / Puffin.

Other animals: Dolphin / Porpoise / Basking Shark / Minke Whale / Orca.



| Scottish wildlife? | What habitat does the species live in? | Are they herbivores, carnivores or omnivore? | What do they like to eat? |
|--------------------|--|--|---------------------------|
| Osprey | | | |
| Otters | | | |
| Highland cattle | | | |
| Brown hare | | | |
| Capercaillie | | | |
| Pine marten | | | |
| Scottish wildcat | | | |
| Red deer | | | |
| Ptarmigan | | | |
| Golden eagle | | | |

For further activities
rzss.org.uk/education

To learn more about Scottish animal and the landscape go to nature.scot/
Can you find a cool fact about each animal?
<https://scottishwildlifetrust.org.uk/scotlands-wildlife/>

Answers

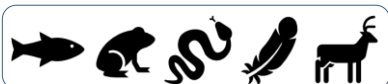
| Scottish wildlife? | What habitat does the species live in? | Are they herbivores, carnivores or omnivore? | What do they like to eat? |
|--------------------|--|--|--|
| Osprey | Rivers / lochs / marshes (Wetlands) | Carnivore | Fish (trout, pike and perch) |
| Otters | Rivers / sea | Carnivore | Fish, amphibians and crustaceans |
| Highland cattle | Farmlands / meadows/hills | Herbivore | Grass, leaves, flowers, shrubs and browse on low hanging trees. |
| Brown hare | Farmland | Herbivore | Tender grass shoots, including cereal crops |
| Capercaillie | Forest | Herbivore | Pine needles and blaeberrries. Young chicks feed on insects they find in the ground vegetation |
| Pine marten | Pine forest | Omnivore | Small mammals, fruit (rowan and blaeberrries), small birds, insects and carrion |
| Wildcat | Farmland / woodland / moorland | Carnivore | Small mammals, birds, rabbits, hares and game and other creatures of a similar size. |
| Red deer | Moorland | Herbivore | Grasses are their main food, but they will eat tree shoots, sedges and rushes, herbs and shrubs. |
| Ptarmigan | Tundra | Omnivore | Plant buds, catkins, leaves, flowers, small twigs, berries, and seeds. They also consume spiders, insects, and occasionally snails |
| Golden eagle | Caledonian pine forest / high plateau | Carnivore | Medium sized mammals and birds such as rabbits, hares, grouse and ptarmigan. Red deer are taken as carrion. |



Scottish Classification.

You can see all of these animals in Scotland, but which vertebrate do they belong to? Is it a Fish, Amphibian, Reptile, Bird, or a Mammal.
Circle your answer.

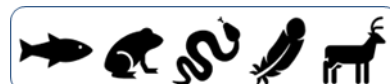
Ptarmigan



Red squirrel



Atlantic salmon



Common Lizard



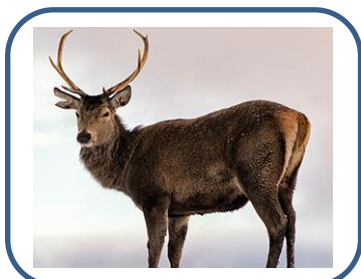
Wildcat



Slow worm



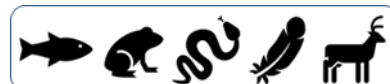
Red deer



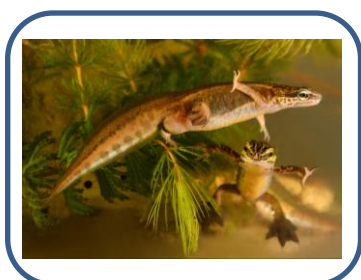
Common toad



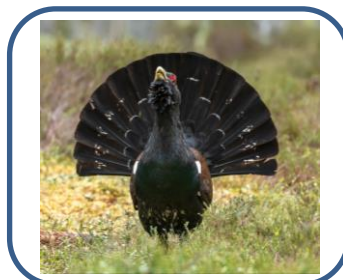
Red grouse



Palmate newt



Capercaillie



Common adder



Answers: Scottish Classification.

You can see all of these animals in Scotland, but which vertebrate do they belong to? Is it a Fish, Amphibian, Reptile, Bird, or a Mammal. Circle your answer.

Ptarmigan

Ptarmigan are found across the arctic and subarctic on rocky mountainsides and tundra. There is an isolated population in the mountains of Scotland



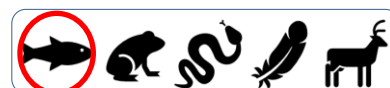
Red squirrel

The red squirrel population has reduced in number in the UK. Fewer than 140,000 animals are left, 85% of which are in Scotland



Atlantic salmon

Human activities have heavily damaged salmon populations across their range. The major impacts were from overfishing.



Common Lizard

The viviparous lizard is widely distributed throughout Europe and Asia. Its range extends to the north of the Arctic Circle.



Scottish wildcat

Wildcats in Scotland have become extremely rare. Without help from projects like Saving Wildcats, the species is likely to become extinct.



Slow worm

The slow worm has protected status, alongside other native British reptiles. Its population is decreasing in numbers.



Red deer

Red deer are also often depicted on Pictish stones (circa 550–850 AD). From the early medieval period in Scotland, they have been hunted by human or animal predators.



Common toad

The common toad is found throughout most of Europe, with the exception of Ireland, Iceland and some Mediterranean islands.



Red grouse

The red grouse population is estimated to be 250,000 pairs with around 1–5,000 pairs in Ireland. They have declined due to loss of habitat in areas where they were once common.



Palmate newt

The palmate newt prefers shallow ponds on acid-rich soils. It is commonly found on heathland in the south and west, and in the north on moorland and bogs.



Capercaillie

The capercaillie, largest of the grouse family, was exterminated in Scotland in 1785. Reintroduced in 1875 is once again it is facing a crisis of extinction.



Common adder

The adder is the only venomous snake native to Britain. They are not aggressive animals and will only use their venom as a last means of defence



Scottish Common Sense.

Circle the main sense used by each of the animals to survive?

Is it sight, hearing, touch, taste or smell?

Circle your answer.

Ptarmigan



Red squirrel



Atlantic salmon



Common Lizard



Wildcat



Slow worm



Red deer



Common toad



Red grouse



Palmate newt



Capercaillie



Common adder



Answers: Scottish Common Sense.

Circle the main sense used by each of the animals to survive and investigate their environment? Circle your answer.

Ptarmigan

A ptarmigan's **eyesight** is the most important of its senses so that it can avoid predators like birds of prey and foxes.



Red squirrel

Their main sense is **smell** so that they can find their food, particularly when they store it for the winter



Atlantic salmon

Salmon have good senses of smell, hearing & taste. Their sense of smell has been reported to be 1,000 times more sensitive than a dog's! This olfactory ability is crucial in guiding salmon back to their natal rivers for spawning.



Common lizard

They have the ability to **smell** airborne molecules that enter the nostrils and is distinct from taste. They also analyse chemicals with taste buds on the tongue. These senses help reptiles locate prey and warn of prey that might be toxic.



Wildcat

They can **see** in low light levels, and have a special layer behind the retina that reflects light back. They can see the same level of detail as humans with 1/6 the amount of light. Their sense of **smell** is about 14 times better than a human.



Slow worm

Like lizards the slow worm is able **taste** the air using the Jacobson organ using their forked tongue to locate their prey.



Red deer

Their sense of **smell** is excellent and the muzzle is a sensitive, tactile tool. Red deer have a number of external scent glands with a variety of functions, including scent marking and indicating sexual fertility in hinds. Their **eyesight** & **hearing** are also very good.



Common toad

They have a highly developed sense of **hearing**. They can detect high-pitched sounds with their ears & low-pitched sounds through their skin. They also have a highly developed sense of **sight** (large eyes) and a keen sense of **smell** to identify food.



Red grouse

Their main sense is their **eyesight** so that can avoid their predators like birds of prey.



Palmate newt

Amphibians like newts have a great sense of **smell**. Some species can find prey and mates just by smell. Newts don't have ears and are totally deaf to airborne sounds. They do however have an internal ear which can pick up ground vibrations.



Capercaillie

Their main sense is their **eyesight** so that can avoid their predators like birds of prey.



Common adder

Their senses of **vision** and **smell** are well-developed. Snakes smell by darting out their tongue, picking up scent particles in the air and press it up against their Jacobson's organ in the roof of their mouth.



Scottish wildlife and animal adaptations 1

Animals have become better suited for survival in particular habitats through the process of evolution. For the following animals find out what habitat they are from and what their diet is. Then write down any adaptations you think the animal has to make it better suited to that habitat or food source.

Red squirrel

Habitat: _____

Wild diet: _____

Adaptations: _____



Red deer

Habitat: _____

Wild diet: _____

Adaptations: _____



Black grouse

Habitat: _____

Wild diet: _____

Adaptations: _____



Discuss: How might these animals be affected by climate change?

Answers: Scottish wildlife and animal adaptations 1

Animals have become better suited for survival in particular habitats through the process of evolution. For the following animals find out what habitat they are from and what their diet is. Then write down any adaptations you think the animal has to make it better suited to that habitat or food source.

Red squirrel (*Sciurus vulgaris*)

Habitat: Conifer forest to broadleaf woodland

Wild diet: Red squirrels are omnivores, meaning that they both plant and animal matter. The seeds of various trees the majority of their diet

Adaptations: Large eyes and long hind limbs adapted for leaping. The ability to hibernate and the skill to cache food for harder times



Red deer (*Cervus elaphus*)

Habitat: moorland and mountainsides, as well as Grasslands near to woodland.

Wild diet: grasses, rushes and dwarf shrubs ,heather.

Adaptations: The stags have large antlers very acute sense of sight and hearing. Their eyes are located on either side of its head giving it a wide field of view. It also has manoeuvrable ears. This combination makes it very difficult predators to sneak up on a deer.



Black grouse (*Lyrurus tetrix*)

Habitat: Often found on the fringes of upland heather moors and native woodland.

Wild diet: Adults graze on the shoots and buds of larch, birch and heather as well as the berries of hawthorn, rowan and blaeberry. Young chicks feed on insects.

Adaptations: Black grouse have a very distinctive courtship ritual. In the spring, male grouse begin competition with other males in hopes of attracting a female. Black grouse hens visiting the lek decide the overall healthiest male.



Scottish wildlife and animal adaptations 2

Animals have become better suited for survival in particular habitats through the process of evolution. For the following animals find out what habitat they are from and what their diet is. Then write down any adaptations you think the animal has to make it better suited to that habitat or food source.

Beaver (*Castor fiber*)

Habitat: _____

Wild diet: _____

Adaptations: _____



Scottish Crossbill (*Loxia scotica*)

Habitat: _____

Wild diet: _____

Adaptations: _____



Adder (*Vipera berus*)

Habitat: _____

Wild diet: _____

Adaptations: _____



Discuss: How might these animals be affected by climate change?

Answers: Scottish wildlife and animal adaptations 2

Animals have become better suited for survival in particular habitats through the process of evolution. For the following animals find out what habitat they are from and what their diet is. Then write down any adaptations you think the animal has to make it better suited to that habitat or food source.

Beaver (*Castor fiber*)

Habitat: Beavers live mainly in freshwater lochs, moving rivers and burns.

Wild diet: Aquatic plants, grasses and shrubs during Summer months and woody plants and bark in winter.

Adaptations: They are able to stay underwater for longer periods of time. They have large, ever-growing, chisel shaped teeth. Gives them access to food that they couldn't reach without felling the tree like buds, leaves and bark of trees.



Scottish Crossbill (*Loxia scotica*)

Habitat: Pine woods and conifer forests of northern Scotland

Wild diet: Seeds from the cones of pine, spruce and larch.

Adaptations: They are specialist feeders on conifer cones, and the unusual bill shape is an adaptation to assist the extraction of the seeds from the cone.



Adder (*Vipera berus*)

Habitat: Woodland, heathland, moorland and coastal habitats.

Wild diet: Small mammals, nestlings and lizards

Adaptations: Females incubate the eggs internally, 'giving birth' to three to twenty live young. Adders hibernate from October, emerging in the first warm days of March,

